

Harmonizing the CT/CTA Stroke Protocol in Alberta for Major Stroke

Critical

Strongly Encouraged

Suggested Guideline	Description	Supporting Evidence
No wait for creatinine philosophy	Immediately do a CTA after a NCCT while patient is still on the CT table. Contrast induced nephropathy called into question as an entity. Recent large case control studies with propensity matching show no evidence of this condition.	Canadian Stroke Best Practice Recommendations- Hyperacute Wait for a serum creatinine before giving intravenous contrast? No!
Noncontrast CT which includes thin section CT for hyperdense sign length determination	NCCT head thin section 0.5-mm slice thickness to identify Hyperdense artery signs and length as well as tPA response. No additional radiation with sequential imaging. Thrombus length was measured as length of arterial hyperdensities in admission nonenhanced CT images with a slice width of 1.25 to 2.5 mm. No recanalization was noted in any intravenous tPA patient with a thrombus length >8 mm. – <i>Reconstruction without extra imaging- if no CTA available can may decision on large long clots .5mm is good for this</i>	Topical Review Imaging – Stroke Detection of Thrombus in Acute Ischemic Stroke Value of Thin-Section Noncontrast-Computed Tomography
CTA neck and head 0.625 mm source images	Neck CTA with mCTA head 0.5-mm source images can be used for quick determination of proximal occlusion Residual flow at intracranial occlusion site/ Nonocclusive thrombi Extracranial thrombus (donut sign).*	Topical Review Imaging – Stroke
Multiphase CTA (2 additional movements of gantry) 1 mSV additional radiation	Evidence of moderate-to-good pial collateral filling defined by multi-phase or dynamic CTA, or evidence of CT perfusion mismatch. Multiphase CTA is an alternative technique that generates time-resolved cerebral angiograms of brain vasculature from the skull base to the vertex in 3 phases after contrast injection. It identifies crucial pathophysiology, such as slow flow, delayed collateral filling, and delayed contrast leakage (ICH), similar to 4D CTA. Aortic arch to vertex CTA is performed with a multidetector CT scanner during the first phase of acquisition timed to capture the peak arterial phase in a healthy brain for 7 s. The remaining 2 phases are from the skull base to the vertex in the equilibrium/peak venous and late venous phases by the movement of the CT gantry over the cranium ≈8 s apart. Multiphase CTA has advantages, including the speed of acquisition and interpretation, minimal additional radiation, no additional contrast material, whole-brain coverage, and no post processing.	Canadian Stroke Best Practice – Endovascular Topical Review Imaging – Stroke Escape Trial New Tool For Imaging Triage of Patients with Acute Ischemic Stroke

Multiphase CTA thick section (23 mm) MIPs of all three phases	Allows for collateral grading. Good collaterals have good collateral filling on 1 st phase. Fair collaterals have one or two phase delay in collateral filling and poor collaterals have absent filling on any phases in significant portion of MCA territory.	
Thick section coronal neck and thick section coronals and sagittal MIPs	The mCTA head coronal thick MIPs will help identify terminal ICA occlusion and determine type M1 versus M2 occlusion. The mCTA head sagittal thick MIPs will help identify distal M2 and beyond occlusions; ACA occlusions, and distal vasculopathy.	Topical Review Imaging – Stroke
Noncontrast sequential “point and shoot” is preferred versus spiral acquisition to optimize EIC detection	NCCT head standard 5-mm slice thickness axial plane images.** Image quality for early ischemic change detection best with sequential imaging. Less bony artifacts than spiral acquisition. Very low mAmp-sec and kV will result in very poor tissue contrast. The imaging acquisition parameters should be optimized for tissue contrast. – <i>Sequential imaging takes about 15 seconds longer to optimize.</i>	Topical Review Imaging – Stroke

**It is not required to show 3-D Terra-recon images. It is not useful to center the images around the carotid artery only – this is not always the vessel of interest. If these are desired, they should be programmed AFTER the fact to avoid delaying the movement of the images to PACS. These extra images are non-essential for decision-making*

***It is not necessary to show coronal or sagittal MIPs. If other planes are desired, they should be programmed AFTER the fact to avoid delaying the movement of the images to PACS. These extra images are non-essential for decision-making.*

Key programming and data movement decisions are the following:

- a) NCCT head and reconstructions should be completed and sent to PACS immediately.
- b) mCTA arch-to-vertex and reconstructions should be completed and sent to PACS next.

Thus, there are two pushes to PACS. The purpose of this is to maximize decision making information as early as possible after imaging is completed:

- 1.) Detection of Thrombus in Acute Ischemic Stroke
- 2.) Value of Thin-Section Noncontrast-Computed Tomography

For questions, please contact the Cardiovascular Health & Stroke Strategic Clinical Network™ at:

CardiovascularHealthStroke.SCN@ahs.ca Office: 403-617-0115